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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/088,654	03/14/2002	Stephen Lipson	22868.68	2784

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William H Dippert
Cowan Liebowitz & Latman
1133 Avenue of the Americas
New York, NY 10036-6799

EXAMINER	
LEE, HWA S	

ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 10/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/088,654	LIPSON ET AL.	
	Examiner	Art Unit	
	Andrew Hwa S. Lee	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 August 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *14* is/are allowed.

6)☒ Claim(s) *1-8 and 10-13* is/are rejected.

7)☐ Claim(s) *9* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. **Claims 1-7, 10, and 12** are rejected under 35 U.S.C. 103(a) as being unpatentable over Nikitin et al (6,628,376) in view of Dobschal et al (5,999,262), Maule (5,415,842), and Freischlad (5,185810).

Nikitin et al (Nikitin hereinafter) show an apparatus and method of examining biological, biochemical, and chemical characteristics of a medium comprising:

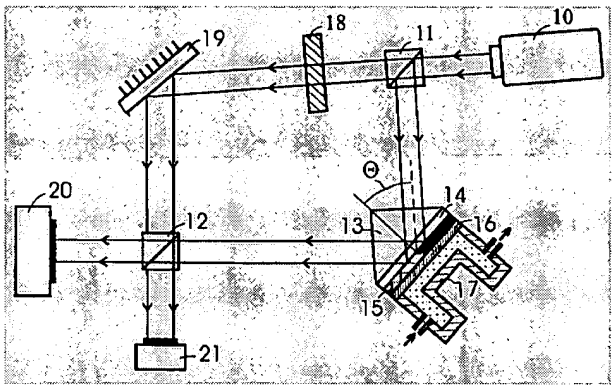
a thick transparent substrate (14) with a planar surface on which a thin layer of conducting material (15) is deposited (column 7, line45+), onto which is placed the combination sample(16, 17) being investigated, on said thin layer of conducting material;

a light source (10) linearly polarized in a predetermined direction (column 7, lines51+), whose light beam is reflected from said thin layer of conducting material from the side opposite

to that on which the sample is placed at an angle substantially equal to that at which the interaction with the plasma resonance produces minimum reflectance intensity (column 7, lines 66+), the evanescent light field on the far side of the conducting film interacting with the sample, thus modifying the reflected light (column 7, lines 57-65);

an interferometer (column 8, lines35+) which enables the reflected beam to be compared interferometrically with a reference beam derived from the same source, but not having had any interaction with the sample; and

an imaging means (20, 21) for recording an image in interference with the reference beam.



Nikitin does not expressly say that the incident angle is which the plasma resonance is at maximum. However Nikitin says that the incident angle is at which the reflectance intensity is at a minimum and ideally at zero (column 7 line 57-column 8 line 5).

Maule shows a surface plasmon resonance device wherein Maule teaches that at the angle plasma resonance occurs, there is a dip in reflectance intensity (column 1 lines23+ and column 3, line 31+). Therefore, from the teaching of Nikitin that the angle should be at minimum reflectance intensity and from Maule's teaching that reflectance intensity drops with plasma

resonance, one of ordinary skill in the art would conclude that the angle of incident should be at the angle at which maximum plasma resonance occurs.

Nikitin also does not expressly show that the image is digitized and a processing means for processing said digitized image to provide an output image, although Nikitin shows an output image.

Freischlad shows a method for optical testing of samples comprising digitizer (10) for digitizing the interferometric image, a processor circuitry (11-25) and a display (26).

At the time of the invention, one of ordinary skill in the art would have combined the apparatus of Nikitin with the apparatus of Freischlad in order to analyze the phase signals from the detectors and to display the data in order to characterize the sample.

Nikitin also does not expressly show that an image of the planar surface is obtained.

Dobschal et al (Dobschal hereinafter) show a detecting of structural changes of specimens wherein an image of the planar surface is obtained.

At the time of the invention, one of ordinary skill in the art would have obtained the image of the planar surface in order to spatially resolve the different portions of the sample (column 6, lines 31-46).

For **claim 2**, since the combination sample (16, 17) is placed on the conducting material, the combination sample is placed within up to about 3 wavelengths of the radiation being used for the investigation.

For **claims 3-6**, Nikitin shows that the light source is a He-Ne laser and that it is polarized in the p-plane relative to the sample (column 7, lines 51-53).

For **claim 7**, the embodiment of Figure 2 is in a Mach-Zehnder arrangement.

For **claim 10**, Nikitin and Dobschal shows a CCD (20).

Claim 12, Freischlad shows that the processor resolves for phase characteristics for each pixel using a known algorithm.

4. **Claim 8** is rejected under 35 U.S.C. 103(a) as being unpatentable over Nikitin, Dobschal, Maule, and Freischlad as applied to claim 1 above further in view of Batchelder et al. (5,220,403).

Nikitin shows the apparatus in a Mach-Zehnder interferometer arrangement but Nikitin, Dobschal, Maule, and King do not expressly show the apparatus in a Linnik interferometer arrangement.

Batchelder et al (Batchelder hereinafter) shows that phase changes on reflection from the sample cause changes in the resonance wavelength (column 13, lined 45+) and that either Mach-Zehnder or Linnik interferometers can be used for microscopic examination of materials (column 13, lines 67+).

At the time of the invention, one of ordinary skill in the art would have modified the Mach-Zehnder interferometer of Nikitin to have a different arrangement of a Linnik interferometer in order to use a system with a high aperture for better resolution of images.

5. **Claim 11** is rejected under 35 U.S.C. 103(a) as being unpatentable over Nikitin, Dobschal, Maule, and King as applied to claim 1 above, and further in view of Eppinger (4,818,108).

Nikitin, Dobschal, Maule, and King do not show the image being recorded on a permanent recording material.

Eppinger shows an interferometer where the image is recorded on either a CCD detector or a photographic film.

At the time of the invention, one of ordinary skill in the art would have recorded the images of Nikitin, Maule, and King on a permanent recording material (photographic film) in order to obtain a permanent copy of the phase image that is easily portable and has a lower cost compared to a CCD detector.

6. **Claim 13** is rejected under 35 U.S.C. 103(a) as being unpatentable over Nikitin et al in view of Maule and Freischlad.

Nikitin et al (Nikitin hereinafter) show a method of examining biological, biochemical, and chemical characteristics of a medium comprising:

placing the sample (16, 17) being investigated onto a thin conducting material (15) which is deposited (column 7, line45+) on a thick transparent substrate (14);

reflecting (column 7, line 51-column 8, line 19), light beam linearly polarized in a predetermined direction (column 7, lines51+) from said thin layer of conducting material form the side opposite to that on which the sample is placed, at an angle substantially equal to that at which the interaction with the plasma resonance creates minimum reflectance intensity (column 7, lines 66+), the evanescent field on the far side of the thin layer of conducting material interacting with the sample (column 7, lines57+), thus modifying the reflected light;

interferometrically comparing said reflected beam with a reference beam derived from the same source, but not having any interaction with the sample (column 8, lines 24+ and column 10, lines 64+);

recording (column 10, lines 64+) an image of a planar surface in interference with the reference beam;

Nikitin does not expressly say that the incident angle is which the plasma resonance is at maximum. However Nikitin says that the incident angle is at which the reflectance intensity is at a minimum and ideally at zero (column 7 line 57-column 8 line 5).

Maule shows a surface plasmon resonance device wherein Maule teaches that at the angle plasma resonance occurs, there is a dip in reflectance intensity (column 1 lines23+ and column 3, line 31+). Therefore, from the teaching of Nikitin that the angle should be at minimum reflectance intensity and from Maule's teaching that reflectance intensity drops with plasma resonance, one of ordinary skill in the art would conclude that the angle of incident should be at the angle at which maximum plasma resonance occurs.

Nikitin also does not expressly show the digitizing and processing of the interference image

Freischlad shows a method for optical testing of samples comprising digitizing the interferometric image (column 5, lines 46+), a processor circuitry (column 5, lines 47+) and a display (26).

At the time of the invention, one of ordinary skill in the art would have combined the method of Nikitin with the method of Freischlad in order to analyze the phase signals from the detectors in order to characterize the sample.

Allowable Subject Matter

7. Claim 14 is allowed.

8. Claim 9 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record fails to show or to suggest a device for measuring simultaneously the phas at each point in an image formed by light reflected from a sample, in which the phase has been modified by plasma resonance comprising of all the elements as presently claimed wherein the light beam is illuminated annularly in combination with an interferometer.

Response to Arguments

Applicant's arguments with respect to claims 1-14 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Hwa S. Lee whose telephone number is 571-272-2419. The examiner can normally be reached on Tue-Fr.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley Jr. can be reached on 571-272-2800 ext 77. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Andrew H. S. Lee
Examiner
Art Unit 2877